

REMARKS

This application contains claims 1-45. Claim 40 has been amended. No new matter has been added. Reconsideration is respectfully requested.

Claim 40 was objected to for an informality. The claim has been amended to correct the informality as suggested by the Examiner.

Claims 1-4, 11, 13, 15-19, 26, 28, 30-34, 41, 43 and 45 were rejected under 35 U.S.C. 102(b) over West, et al. (U.S. Patent 6,131,148), while claims 5-10, 12, 14, 20-25, 27, 29, 35-40, 42 and 44 were rejected under 35 U.S.C. 103(a) over West in view of information provided in the Background section of the present patent application, referred to by the Examiner as "AAPA." Applicant respectfully traverses these rejections.

West describes a method for setting up a PPRC session for copying data from a primary storage volume to a secondary storage volume, with snapshot copying of the secondary volume (col. 2, lines 21-36). This arrangement is said to avoid delay and storage problems associated with snapshot copying of the primary volume, while achieving the same result (col. 2, lines 51-56).

Claim 1 recites a method that uses a protocol that supports a given logical address range in order to copy data between storage devices in logical subsystems having logical

addresses that are outside the logical address range supported by the protocol. For this purpose, the primary storage system sends a command frame followed by a data frame, which identifies the target storage device. Both the command and data frames comply with the protocol, despite the "out-of-range" logical address of the logical subsystem containing the target storage device.

West neither teaches nor suggests the use of logical addresses that are outside the range supported by the protocol used for a data copying operation. In rejecting this claim, the Examiner maintained that the virtual addresses mentioned in West's claims 6 and 8 are outside the logical address range supported by West's protocol. West, however, makes no such suggestion. West mentions virtual addresses in his specification as a possible temporary storage location on the secondary volume while awaiting archiving (col. 4, lines 15-18; col. 8, lines 10-13). The use of virtual memory in this manner is a local function of the storage volume in question and has nothing to do with the logical addresses of the logical subsystems or the protocol used in communicating between the storage systems.

The Examiner went on to maintain that "West's invention tries to solve the limited addresses by using virtual addresses which... corresponds to the logical addresses outside

of the given logical address range," citing col. 11, lines 47-58. (Applicant believes the Examiner intended to refer to col. 1, lines 47-58.) West's solution to this problem, however, is not to use logical addresses that are outside the supported range of the network protocol. Rather, West's solution is to perform snapshot copying at the secondary volume, instead of at the primary (col. 2, lines 51-53).

If West were to use logical subsystem addresses outside the range supported by the network protocol used by his systems (such as the protocols mentioned in col. 5, lines 37-50), his copying operations would simply fail. The Examiner acknowledged this point on page 4, lines 1-2, of the present Official Action. The invention recited in claim 1 solves this problem by identifying the target storage device in the first data frame following the command frame in the copy operation. West suggests no solution, because West does not deal with the problem of logical subsystem addresses that are not supported by the network protocol.

Thus, claim 1 is believed to be patentable over West. In view of the patentability of claim 1, dependent claims 2-10 are also believed to be patentable.

Furthermore, notwithstanding the patentability of claim 1, the dependent claims are believed to recite independently-patentable subject matter, which is neither taught nor

suggested by the cited art. For the sake of brevity, Applicant will not argue the patentability of all the dependent claims, but several representative examples are explained below.

Claim 2 recites that a plurality of virtual paths are created between respective source and target storage devices, and one path logical address is used to carry the plurality of the virtual paths. West makes no mention of the use of multiple virtual paths. It therefore goes without saying that he does not teach or suggest using one path logical address for a plurality of virtual paths, as required by claim 2.

In rejecting this claim, the Examiner cited West's Fig. 2; col. 5, lines 7-12; col. 6, lines 5-10; and col. 1, lines 33-37. Fig. 2 shows a system interconnection 40, which comprises CTC or ESCON portions or T0 lines (col. 5, lines 51-65), i.e., physical interconnections, not virtual paths. The passage in col. 5 that was cited by the Examiner indicates simply that a Virtual Telecommunications Access Method (VTAM) is used in communicating over the system interconnection. The passage cited in col. 1 refers to a plurality of volumes, not of virtual paths. The passage in col. 6 refers to elimination of the VTAM data link. Thus, none of the cited passages teach or suggest the limitations of claim 2.

Claim 4 depends from claim 3, which in turn depends from claim 2, and adds the limitation that the source and destination storage devices in the first and second logical subsystems comprise fixed-block storage devices, while a further logical path over the network is used to carry data in a PPRC operation between source and destination storage devices of a type that stores records of variable size.

In rejecting this claim, the Examiner referred to West's volumes 32 and 60, and asserted that "all conventional storages are fixed block storage that stores variable size data which the data size is smaller than its available capacity." This statement is simply wrong, and also mischaracterizes the claim language. As explained in the present patent application (page 2, line 31 - page 3, line 1), the CKD architecture used in IBM S/390 systems allows data records of variable size to be written to disk, i.e., a CKD-compliant disk cannot be considered a "fixed-block storage device." On the other hand, SCSI devices are unable to receive data records in any form other than fixed block sizes (page 5, lines 5-8). The application writing to a SCSI disk may have less than a full block of new data to write, but the records that it writes to the disk must in any case be of the specified, fixed size.

As noted in MPEP 2111.01, "the words of a claim must be given their 'plain meaning'... [which] refers to the ordinary and customary meaning given to the term by those of ordinary skill in the art." (See *Philips v. AWH Corp.*, 75 USPQ2d 1321 (Fed. Cir. 2005).) In this case, the customary meanings of fixed-block storage devices and variable storage record size were well known in the storage art at the time of filing of the present patent application. The explanation given in the specification, as cited above, is consistent with these customary meanings. Even absent these known, customary meanings, however, the Examiner's attempt to maintain that fixed-block and variable-record-size storage devices are one and the same stretches the plain language of the claim beyond all reasonable interpretation.

Thus, claim 4 is believed to be independently patentable over the cited art, regardless of the patentability of claims 1-3 from which it depends.

Claim 5 depends from claim 2 and adds the limitation that when the frames of the PPRC operation arrive at the secondary storage system, the device header of the command frame is ignored. The second subsystem logical address and the target storage device address are read from the first data frame. The Examiner conceded that West does not disclose this limitation, but maintained that it was a "known function" of

PPRP (assumed to mean "PPRC") and ESCON as described in AAPA (pages 1-5 of the present patent application).

There is no mention or suggestion in pages 1-5 of the present patent application that a secondary storage system should ignore the device header of a command frame. Contrary to the Examiner's statement, ignoring the device header is not a standard part of ESCON or PPRC. In fact, in a standard ESCON-based PPRC arrangement, as was known in the art at the time of filing of this patent application, if the secondary storage system were to ignore the device header in the command frame, it would not be able to determine where the data should be stored. The entire PPRC operation would then fail.

Thus, claim 5 is believed to be independently patentable over the cited art. Should the Examiner choose not to withdraw this rejection, Applicant requests that the Examiner point out the specific page and lines at which the limitations of claim 5 are disclosed.

Claim 8 depends from claim 1 and recites that a command parameter list is inserted in a data block of the first data frame, identifying the second logical subsystem and the target storage device. A parameter list of this sort is shown (item 74) in Fig. 2 of the present patent application. The Examiner conceded that West does not disclose the added limitations of claim 8, but maintained again that they were "known functions"

of PPRC and ESCON as described in AAPA (pages 1-5 of the present patent application).

In conventional ESCON-based PPRC arrangements that were known in the art at the time of filing of the present patent application, the logical subsystem of the second storage device was indicated in the header of the command frame. The data blocks of the data frames were reserved for data. There is no hint in pages 1-5 of the present patent application that a command parameter list identifying the second logical subsystem and the target storage device could have been inserted in a data block of the first data frame, as recited in claim 8.

Thus, claim 8 is believed to be independently patentable over the cited art. As in the case of claim 5, should the Examiner choose not to withdraw this rejection, Applicant requests that the Examiner point out the specific page and lines at which the limitations of claim 8 are disclosed.

Claim 11 is an independent claim, which recites a method for copying data over a network that operates in accordance with a protocol supporting storage devices that store records of variable size. A logical path is established to carry data over the network between source and target storage devices that store records only of fixed block size. A PPRC operation is initiated by sending command and data frames over the

logical path, such that the form of both the command and data frames complies with the protocol for storage devices that support variable-size records.

In rejecting this claim, the Examiner stated merely that the claim "[encompasses] the same scope of the invention as that of... claims 1-4." This statement is incorrect, since claim 11 recites a protocol that supports storage devices that store variable-size records, and no such limitation appears in claims 1-4. West neither teaches nor suggests the use of such a protocol in establishing a logical path and carrying out a PPRC operation between storage devices that store records only of fixed block size, as recited in this claim. As stated in MPEP 2131:

To anticipate a claim, the reference must teach every element of the claim. "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki MotorCo.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The Examiner has not shown that every element of claim 11 is disclosed in the cited art.

In referring to the grounds of rejection of claim 4 in rejecting claim 11, the Examiner may have intended to argue that there is no distinction between fixed-block and variable-size record storage devices, as he did in reference to claim

4. On this point, Applicant reiterates that this interpretation stretches the claim language to the point of meaninglessness, well beyond the broadest reasonable interpretation that might be attributed to these terms by people of ordinary skill in the art.

Thus, claim 11 is believed to be patentable over West. In view of the patentability of claim 11, dependent claims 12-15 are also believed to be patentable.

Furthermore, notwithstanding the patentability of claim 11, these dependent claims are believed to recite independently-patentable subject matter, which is neither taught nor suggested by the cited art. Claims 12-15 were rejected on similar grounds to certain of dependent claims 2-10, and Applicant's responses to the Examiner's arguments are thus similar to those stated above.

Claims 16-45 recite systems and computer software products that operate on principles similar to those of method claims 1-15. Thus, for the reasons explained above, claims 16-45 are believed to be patentable over the cited art.

Applicant has studied the additional references made of record by the Examiner and believes the claims in this application to be patentable over these references, as well.

Applicant believes the amendments and remarks presented hereinabove to be fully responsive to all the objections and

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grounds of rejection raised by the Examiner. In view of these amendments and remarks, Applicant respectfully submits that all the claims in the present application are in order for allowance. Notice to this effect is hereby requested.

If the above amendment should not now place the application in condition for allowance, the Examiner is invited to call undersigned counsel to resolve any remaining issues.

Respectfully submitted,

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